

Claims

1. A dispensing closure for a container, the closure being operable to dispense at least one product carried by the closure into the container, the container having a neck portion with which the closure is to engage, the closure including:
 - 5 a body having an outer wall portion adapted to engage an outer surface of the container neck to releasably secure the closure to the container,
 - a compartment to contain the at least one product to be dispensed, the compartment being adapted to fit at least partly within the container neck and being defined by a substantially cylindrical side wall, a top wall and a frangible bottom wall,
 - 10 cutting means moveable relative to the side wall and the bottom wall to break open the frangible bottom wall of the compartment to selectively dispense contents of the compartment into the container, and
 - means restricting inadvertent relative movement of the cutting means,
 - said closure and product to be dispensed being assembled together prior to
 - 15 application of the closure to the container neck.
2. A dispensing closure according to claim 1 wherein the outer wall portion of the body is substantially cylindrical, and the body further includes a coaxial inner wall adapted to engage within the container neck.
3. A dispensing closure according to claim 1 or claim 2 wherein the outer
- 20 wall portion is provided with internal threads adapted to threadingly engage a threaded neck of a container to which the closure is to be fitted.
4. A dispensing closure according to claim 2 wherein the inner wall closely engages within the container neck, and the compartment fits within the inner wall.
5. A dispensing closure according to any one of the preceding claims
- 25 wherein the compartment is separate from the body and is interconnected thereto to facilitate relative rotation therebetween about the axes thereof.
6. A dispensing closure according to any one of the preceding claims wherein an upper end of the compartment is formed with a rim having engaging means to engage corresponding engaging means on the closure body whereby the
- 30 compartment is assembled to the body and is rotatable relatively thereto.
7. A dispensing closure according to claim 5 or claim 6 wherein the compartment and the body are able to be snap-fitted together so that the compartment is able to rotate about its axis relative to the body.
8. A dispensing closure according to any one of the preceding claims
- 35 wherein the bottom wall of the compartment extends at an angle to a plane perpendicular to the axis.
9. A dispensing closure according to any one of the preceding claims wherein said cutting means includes a cutting knife carried on a flange extending generally radially inwardly from a lower edge portion of an inner wall of the body, the

flange being axially spaced from the frangible bottom wall of the compartment, the knife extending in a generally axial direction from the flange towards the frangible bottom wall.

10. A dispensing closure according to any one of claims 1 to 8 wherein said
5 cutting means includes a cutting knife extending axially from the top wall of the compartment inwardly of the compartment side wall and movable about the axis.

11. A dispensing closure according to claim 9 or claim 10 wherein on relative movement of the knife, the frangible bottom wall is brought into contact with the knife which cuts and breaks open the bottom wall from the compartment permitting contents
10 thereof to be dispensed into the container to which the closure is fitted.

12. A dispensing closure according to claim 11 wherein said relative movement is a relative axial movement between the knife and the bottom wall.

13. A dispensing closure according to any one of claims 1 to 3, wherein the compartment and body are integral such that the cylindrical side wall of the
15 compartment constitutes an inner wall of the body, and a substantially cylindrical band engages with an outer surface of the side wall adjacent its free edge, the band having a generally radially inwardly extending flange carrying said cutting means.

14. A dispensing closure according to claim 13 wherein the cutting means is a cutting knife which extends from the flange in a generally axial direction towards the
20 top wall.

15. A dispensing closure according to claim 14 wherein the cutting knife is housed in a pocket formed in said side wall of the compartment, the cutting knife being movable about the axis of the compartment to be released from the pocket so as to then cut the bottom wall at least partly from the container to allow the product in the
25 compartment to pass into the container.

16. A dispensing closure according to any one of claims 1 to 7 wherein said cutting means includes a cutting knife carried on a flange extending generally radially inwardly from a lower edge portion of an inner wall of the body, the flange being axially spaced from the frangible bottom wall of the compartment, the knife extending
30 in a generally axial direction from the flange towards the top wall, the cutting knife being housed in a pocket formed in said side wall of the compartment, the cutting knife being movable about the axis of the compartment to be released from the pocket so as to then cut the bottom wall at least partly from the container to allow the product in the compartment to pass into the container.

35 17. A dispensing closure according to any one of claims 1 to 6, and 10 wherein the compartment is axially moveable relative to the cutting means to cause the cutting means to cut the frangible bottom wall.

18. A dispensing closure according to any one of the preceding claims wherein said cutting means comprises a cutting knife integrally moulded with a wall of

the closure, the knife having at least two cutting edges extending at an acute angle to each other.

19. A dispensing closure according to claim 5 to 8 wherein said cutting means comprises a knife edge formed on a lower edge portion of an internal wall extending
5 from the compartment top wall, said top wall being axially movable relative to the bottom wall to cause the knife edge to cut away at least a portion of the bottom wall to allow product in the compartment to pass into the container.

20. A dispensing closure according to claim 19 wherein a centre portion of said top wall is resiliently axially movable relative to the closure body and the internal
10 wall is connected to the said centre portion to be movable therewith whereby the frangible bottom wall is cut by said resilient axial movement.

21. A dispensing closure according to any one of the preceding claims wherein the body includes, on a lower edge of the outer wall, a tamper proof evidence release band to provide an indication of tampering with the closure prior to its use.

15 22. A dispensing closure according to any one of the preceding claims 1 to 10 wherein the body includes, on an upper edge of the outer wall portion, a tab adapted to engage within an opening formed in a rim of the compartment, the tab ensuring proper alignment of the compartment and the body when assembled as well as acting to resist inadvertent relative movement of the cutting means.

20 23. A dispensing closure according to any one of the preceding claims wherein a contents dispensing valve is formed integral with the top wall of the compartment to facilitate dispensing contents of the container after the frangible bottom wall of the compartment has been cut to allow product in the compartment to pass into the container.

25 24. A dispensing closure according to any one of the preceding claims wherein the compartment is separated into a plurality of parts by one or more internal partitions to separately house a plurality of different products to be selectively dispensed into the container.

25 25. A method of dispensing at least one product into a container, the method including the steps of:

assembling a compartment containing a product to be dispensed with a closure body,

engaging the assembled closure with a neck portion of a container into which the product is to be dispensed,

35 providing a cutting knife adjacent a bottom wall of the assembled closure, and rotating the knife relative to the bottom wall to cause the knife to cut into the bottom wall to thereby release the contents of the compartment into the container

26. A method of dispensing at least one product into a container, the method including the steps of:

assembling a compartment containing a product to be dispensed with a closure body,

engaging the assembled closure with a neck portion of a container into which the product is to be dispensed,

- 5 providing a cutting knife adjacent a bottom wall of the assembled closure, and
axially moving the knife relative to the bottom wall to cause the knife to cut into the bottom wall to thereby release the contents of the compartment into the container

27. A dispensing closure substantially as hereinbefore described with reference to the accompanying drawings.

- 10 28. A method of dispensing at least one product into a container including the steps substantially as hereinbefore described with reference to the accompanying drawings.